Remarks/Arguments

Presently pending claims are claims 19-22, 24 and 25. Claims 19 and 20 have been amended.

Retraction of Appeal Brief and imposition of new grounds of rejection on new references is noted.

Claim 23 has been rejected on the second paragraph of 35 USC 112 as being indefinite. Since claim 23 has been canceled, the issue of indefiniteness is moot.

Claims 19 and 20 have been rejected under 35 USC 102(e) as anticipated by the Hunt reference. It is believed that claims 19 and 20 are ho longer properly rejectable on the Hunt reference since claims 19 and 20 have been amended to specify that the thin film or coated material is made by thermal spraying solution precursors and are devoid of splat microstructures greater than several microns thick whereas the Hunt reference discloses powder formation and thin film deposition by vapor deposition.

Claims 21-25 were rejected under 35 USC 103(a) as being obvious over the Hunt reference. Since the Hunt reference does not exemplify an embodiment that is both multilayered and graded, the Examiner has concluded that it would have been ob obvious to form a multilayer nanostructure which was graded since it is specifically suggested as a suitable structure by the reference.

The rejection of claims 21-25 as being obvious over the Hunt reference is hereby traversed. The amendment of claims 19 and 20 to

limit the multilayer thin film or coating to a material that is made by thermal spraying of solution precursors and a material that is devoid of splat microstructures greater than several microns thick. As noted at bottom of p. 2 and top of p. 3 of the specification, although thermal spraying is a viable approach to preparing thick coatings, the use of the powder agglomerate feedstock has limitations and problems. First, the sprayable powders often require reprocessing from the parent powders by controlled agglomeration, which adds more cost to the production and often introduces impurities if surface-active precursors are used as binders. Second, the splat boundaries in the as-sprayed coatings are often the initiation sites for flaw propagation that consequently lead to mechanical failure of the coatings. Third, the as-formed splat microstructures present a limitation on the scale of chemical homogeneity and mixing of multiphasic materials when desired because the splat is at least greater than several microns thick, due to the flattening of the molten particles on impact. From commercial experience, sprayable powders need to be of a certain size such as about 30 microns or larger for efficient deposition. As a result, reconstitution of nanoscale powder to 30 micron-sized agglomerates is often required. Unfortunately, these larger diameter agglomerates produce longer splat microstructures in the coating. These large splat particles become a serious problem when multifunctional applications require multilayered,

hybrid coatings with fine, continuous interfaces, since the length scale of an interface is limited by the splat microstructure. Consonant with what is stated above, the Hunt reference discloses powder formation and thin film deposition by vapor deposition

It is believed that the claimed subject matter herein is unobvious over the Hunt reference and a notice of allowance of claims 19, 20, 21, 22, 24 and 25 is requested.

Respectfully submitted,

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Fax Certification

I hereby certify that this document is being faxed to the PTO on the date shown below:

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